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ABSTRACT

Findings of a study that examined the relationship between student demographic characteristics and at-risk status are presented in this paper. Demographic characteristics likely to place students at risk include low family income, low parental education, single-parent family, and limited-English proficiency. Data were derived from the National Educational Longitudinal Study of 1988 (NELS:88), a survey sponsored by the National Center for Educational Statistics. The database provides information on 24,599 eighth-graders from 1,035 schools nationwide. A followup study of the same students was conducted during spring 1990. Findings indicate that over 50 percent of the eighth-graders in 1988 had at least one of the above characteristics, and about 12 percent had three or more such characteristics, confirming the concern that a significant number of students were at risk for academic failure. The percentage of such students was higher among racial/ethnic minorities and urban area students, indicating the need for greater educational improvement efforts in these populations. The study also examined the impact of multiple characteristics on school success, provided a basis for identifying at risk students, and made recommendations for preventive actions. Seven tables are included. (9 references)
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Measuring Student At-Riskness by Demographic Characteristics

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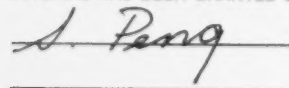
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Abstract

Students with certain demographic characteristics such as low family income, low parental education, single parent, and limited English proficiency are likely to be at risk for lower academic achievement and leaving high school without completion. Based on the National Education Longitudinal Study of 1988 (NELS:88), it is estimated that over 50 percent of the eighth graders in 1988 had at least one such characteristic, and about 12 percent had three or more such characteristics, confirming the concern that a significant number of students were at risk for failure in school. The percentage of such students was higher among racial-ethnic minorities and among students in urban areas, indicating the need for a greater effort to improve the education of these students. This study also examined the impact of multiple characteristics on school success, and provided a basis for identifying students who are most likely at risk and for taking certain preventive actions to foster these students' success in school.

Measuring Student At-Risk Status by Demographic Characteristics

Educators and policymakers have been concerned with students who have a high probability of failing academically, leaving high school without completion, or engaging in socially undesirable activities such as drug use and other misbehaviors. This concern, in fact, has intensified over the years because of the growing number of such students (Pallas, Natriello, McDill, 1989). Thus, identifying such students at an early stage in the school and helping them foster success in learning are important tasks to educators.

Identifying students at risk for failure, however, is not a simple task. Many variables are involved; some of them are not readily measurable. One practical approach is to identify students at-risk on the basis of certain demographic characteristics that have been found negatively related to school performance. Such characteristics include, for example, low family income, low parental education, single parent, limited English proficiency, the lack of supervision after school, having siblings who dropped out of high school, and communities with a poor economic condition and a high crime rate (Pallas, Natriello, & McDill, 1989; Ralph, 1989). Each characteristic represents a disadvantage that may place stresses on students. These characteristics are also relatively easy to measure and verify.

While previous studies have provided some bases for understanding the relationship of these demographic characteristics with the at-risk status of students (Kaufman, Bradby, Owings, 1992; Ralf, 1989), the extent of students having these characteristics and the relative impact of varying combinations of these characteristics are not well understood. This study was, therefore, designed to fill this information gap. The result will further our understanding of subgroup differences in educational performance and the need

of certain students for greater educational resources and efforts. The result will also provide an informed basis to identify students who are most likely at risk for poor achievement and dropping out of school.

Method

Data Base

This study used data from the National Educational Longitudinal Study of 1988 (NELS:88), a survey sponsored by the National Center for Education Statistics, U.S. Department of Education. NELS:88 involved 24,599 eighth graders from 1,035 schools across the country, and collected data about students' educational performance, development, and related factors from students, parents, schools, and teachers. Response rates are about 98% for schools and 93% for students in the base-year survey. Details about the study design and data collection procedures are included in the User's Manual for the base-year data file (Ingels, Abraham, Karr, Spencer, & Frankel, 1990).

During the spring of 1990, the first follow-up survey of the same group of students was conducted. This follow-up survey provided information about transition of students from one school to another that helped determine students' dropout status. Details of the data bases are included in the User's Manual for the first follow-up data files (Ingels, Scott, Lindmark, Frankel, & Myers, 1992).

It should be noted that this study drew data from the base-year parent data file and the first follow-up student data file, each of which involved a somewhat different number of cases. Estimates, however, are properly weighted to reflect population values.

Demographic characteristics

The following demographic characteristics are included in this study: 1) living with a single parent; 2) family income below \$15k (about the poverty

level for a family of four in 1988); 3) being at home alone without adults for 3 or more hours after school; 4) parents' education less than high school; 5) having sibling(s) who dropped out of school; 6) limited English proficiency; 7) at least one parent unemployed; and 8) attending a school where over 50% of students participated in free lunch programs. These characteristics generally reflect stressful environments or the lack of adequate family support and involvement that impede students' learning in school.

Data on these characteristics were provided either by students themselves or parents. Each characteristic was coded into two categories: yes (1) or no (0), meaning having the characteristic or not having the characteristic.

Students' achievement was measured by the combined reading and mathematics test score, collected at the base-year using a test battery developed by the Educational Testing Service. The tests are considered well constructed, valid, and reliable (see Rock, Pollack, Owings, & Hafner, 1991).

Dropout status was based on data collected in the first follow-up survey. Students who reported that they were no longer in school or students who were recorded by the school as dropouts by the tenth grade were classified as dropouts. If a student dropped out and then returned to school by the tenth grade, the student was treated as a persister. A few students in the sample were excluded in some analyses because they did not have information for their school status.

Results

1. At-risk status measured by each characteristic

Consistent with previous findings, the selected demographic characteristics in this study are negatively related to achievement and positively related to dropout status. As shown in Table 1, students living

with a single parent, for example, had a mean test score of 47.7 as compared to 51.0 for other students. Similarly, students from families with incomes below \$15k had a mean test score of 44.8 as compared to 51.8 for other students. Other characteristics show the same pattern, indicating that students with these demographic characteristics are more likely to have low achievement than students without such characteristics.

On the basis of dropout rates, student at-risk status is also clearly indicated by these characteristics. For example, students with parents whose education is below high school are almost five times more likely than other students to drop out (19% vs. 4%). Students with family incomes less than \$15K also show a similar result. For other characteristics, the differences in dropout rate also are significant although the differences are somewhat smaller.

Insert Table 1 about here

The above descriptive findings are misleading in terms of the relative impact of each characteristic because a student having one characteristic is also likely to have other related characteristics. As shown in Table 2, 68% of students with single parents also have one or more other characteristics. Similarly, 84% of students with low family incomes, 85% of students with parents of low education, and 82% of students with limited English proficiency have one or more other characteristics. Thus, the at-risk status of students for low achievement and dropout as measured by each characteristic, in fact, is confounded by the impact of other characteristics. For example, the higher dropout rate of students with a single parent reflects not only the negative

impact of single parent but also the impact of other disadvantaged characteristics.

Insert Table 2 about here

To gain a further understanding of the relative impact of the selected demographic characteristics, students were sorted into groups by the number of characteristics possessed by students, ranging from no such characteristics at all, any one characteristic only, any two characteristics, to five or more characteristics. The mean achievement and dropout rate by these groups are shown in Table 3. They show that students without any of the selected characteristics have a much higher achievement score and a lower dropout rate than students with any characteristics. In fact, students' at-risk status increases when they have multiple disadvantaged characteristics. For example, the average dropout rate for students with any two characteristics is more than twice higher than students with any one characteristic. Students with three or more characteristics appear to have a lower achievement score and higher dropout rate than students with two characteristics, but the difference is not significant at the .01 level. Thus, the critical point seems to be at the two-characteristics level -- students with two or more disadvantaged characteristics are likely to be at risk for school failure.

Insert Table 3 about here

The relative impact of each characteristic is further examined by a multiple regression analysis. Based on the standardized regression coefficients, one can determine whether one characteristic is still

significantly related to student performance after all other characteristics are controlled, and whether one characteristic is more important than the other. Results of the analysis are presented in Tables 4 and 5, respectively, for achievement and dropout rate.

Several patterns can be seen in Table 4. First, the same pattern of relationships between disadvantaged characteristics and achievement is found across subgroups of students, indicating that these characteristics function consistently regardless of students' school and racial-ethnic backgrounds. Second, single parents and unemployed parents are no longer related to student achievement after other variables are considered, suggesting that, contrary to a public notion, single parent per se may not matter much; it is the resources and family support commonly associated with a single parent such as lower income and less time with children to develop a strong emotional tie and support, that make the difference. Also, unemployment does not have a lasting impact on achievement unless it is a prolonged problem. Third, among the other factors, low family income, attending schools in poverty areas, and low parental education are the most powerful ones; they are strong identifiers of students potentially at risk for school failure.

The analysis of dropout rates included one additional characteristic -- lowest quartile in achievement, since poor achievement has also been found to be related to dropout status (Peng & Takai, 1983). As shown in Table 5, single-parent is not related to the dropout rate after other characteristics are considered. Low family income, low parental education, sibling(s) dropped out are consistently related to a higher dropout rate across all subgroups. The remaining characteristics are not very clear. Their relationships with dropout rates vary by subgroups. For example, participation in free or reduced-price lunch program is a significant variable only for minority

students, and home alone without adults for 3 or more hours is a significant variable for students in private schools and white and Asian students.

Insert Tables 4 and 5 about here

2. Prevalence of at-risk status

What percentage of students possess certain characteristics that are associated with educational disadvantage or school failure? Does the percentage differ by subgroups of students as defined by community, school type, and racial-ethnicity background? Results show that over 50% of the eighth graders in 1988 had at least one risk factor, and about 12% had three or more risk factors, confirming the concern that a significant number of students were at risk for school failure (see Table 6). This phenomenon is particularly evident among racial-ethnic minorities -- African, Hispanic, and Native American students. They are more than twice as likely as white and Asian American students to have at least one risk factor. The differences among racial-ethnic groups are even higher for students who had two or more risk factors.

Differences among students by community type and school control are also significant. Students from urban areas are more likely than students from suburban communities to have risk factors. As shown in Table 6, 19% of urban students as compared to 7% of suburban students had three or more risk factors. Similarly, the percentage of students in public schools who had two or more risk factors is 28.5 as compared to 10.2 of religious school students and 4.2 of other private school students (see Table 6).

A closer examination of students by each risk factor revealed that there was a high percentage of students living with single parents (21.7%), coming

from families with income less than \$15k (21.1%), or having sibling(s) who had dropped out of school (16.5%). Only a small percentage of students was classified as having limited English proficiency (2.1%) or was at home alone without adults for three or more hours after school (4.7%) (see Table 7).

Consistent with the earlier findings, the percentage of the 1988 eighth grade students with certain risk factors differed among subgroups. For example, 47% of African American and 38% of Hispanic students as compared to 14% of white students came from families with income less than \$15k. African American students also were more likely than white students to come from single-parent families (46% vs. 18%). Hispanic students' parents had lower education level than others, about one-third of them had less than high school education. Minority students also were more likely than white students to attend schools where over 50% of students participated in free or reduced-price lunch programs, indicating that minority students are more likely to be under the influence of poverty (see Table 7).

By community type and school control, results show that students from urban areas and students from public schools were more likely to have any of the risk factors included in the study than other students. Students from rural areas were similar to students in urban areas, having a higher percentage in each risk factor than students in suburban communities.

Insert Tables 6 and 7 about here

Discussion

This study provides a context for understanding at-risk students. First, the at-risk student problem is serious. As data show, a substantial proportion of students live in disadvantaged environments -- over 50% having

at least one risk factor, confirming the concern about the number of students who may be at risk. This problem is particularly serious among minority students and among students in urban areas. Their at-risk status reflect their generally lower performance levels and the need for greater effort for educating those students.

This study also provides a basis for identifying students at risk. Data show that students in poverty-stricken environments as measured by low family income, low parental education, and participation in free or reduced-price lunch programs, and students with multiple risk factors, most likely of minority students, are at a greater risk for school failure than other students, and thus should be identified at an early stage in school and be given extra help to foster their school success.

In addition to describing the extent of student at-risk status and the relative impact of each risk factor, this study also provides a basis for identifying students for a closer examination to find out other characteristics such as family functioning, community resources, and school environment that are helping or impeding their learning. For example, on the surface, students with single parents are more likely to have lower achievement and a higher dropout rate. When other variables such as parental education level and family income are considered, the single-parent variable is no longer significantly related to student performance. This suggests that it is not single-parent per se, but the support and resources provided by single parents that make the difference, consistent with other study findings (Milne, Myers, Rosenthal, & Ginsberg, 1986). The same argument is applicable to differences in student performance among racial-ethnic groups. When the economic condition and parental education level are considered, minority students are no longer more likely than whites to drop out (see Kaufman,

Bradby, & Owings, 1992), suggesting that it is the poverty factor rather than ethnicity per se that makes the difference in student performance in school. Future research centered around family activities and school and classroom practices that help foster students success in learning will be helpful.

Table 1. Mean achievement score at the eight grade and dropout status at the 10th grade by risk factor

Risk factor	Status	Achievement	Dropout
Single parent	No	51.0 (.16)	4.2 (.47)
	Yes	47.7 (.22)*	10.5 (1.30)*
Family income below \$15k	No	51.8 (.15)	3.2 (.42)
	Yes	44.8 (.21)*	14.4 (1.51)*
Home alone w/o adults for 3+ hours	No	50.9 (.16)	5.3 (.55)
	Yes	46.8 (.23)*	7.6 (1.01)*
Parent education less than high school	No	51.7 (.15)	4.1 (.42)
	Yes	43.1 (.23)*	19.2 (2.62)*
Sibling dropped out	No	50.6 (.18)	3.8 (.53)
	Yes	45.9 (.25)*	14.4 (1.19)*
Limited English proficiency	No	50.5 (.16)	5.5 (.50)
	Yes	41.6 (.67)*	12.3 (2.86)*
At least one parent unemployed	No	50.5 (.16)	5.3 (.48)
	Yes	46.5 (.35)*	14.5 (2.55)*
Attended school with 50%+ in free lunch	No	51.2 (.16)	5.2 (.54)
	Yes	44.8 (.45)*	8.7 (1.23)*

Notes: 1. figures in parentheses are standard errors

2. * indicates the difference between two groups is significant at the .01 level

Table 2. Percentage of students by combinations of characteristics

Characteristic	Alone	With other characteristics			
		1	2	3	4+
Single parent	31.7	32.7	21.7	9.3	4.6
Family income <\$15k	16.2	34.0	29.3	14.6	5.9
Home alone w/o adults 3+ hours	43.9	27.5	14.9	8.4	5.2
Parent education < high school	14.7	28.2	27.1	20.6	9.4
Sibling(s) dropped out	30.4	23.1	23.2	15.9	7.4
Limited English proficiency	18.5	25.2	21.9	20.5	14.0
Parent unemployed	22.5	20.9	22.7	23.7	10.3
Free or reduced-price lunch	29.2	27.9	24.9	11.5	6.4

Table 3. Mean achievement score and dropout rate by the number of risk factors possessed by students

No. of risk factors	Achievement score N		Dropout rate	N
None	53.6 (.15)	10,835	1.5 (.43)	8,461
1	49.5 (.19)	5,521	5.3 (.91)	4,067
2	46.2 (.23)	2,973	12.0 (2.05)	2,085
3	44.0 (.27)	1,622	14.0 (1.44)	1,124
4	42.1 (.33)	694	21.4 (3.31)	469
5 or more	41.1 (.56)	275	17.3 (5.07)	172

Note: Figures in parentheses are standard errors.

Table 4. Multiple regression analysis on achievement

Risk factor	All students		Public schools		Private schools		White +Asian		Minority	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Intercept	52.89	--	52.52	--	55.02	--	53.61	--	48.15	--
Single parent	-.13	-.01	-0.23	-.01	1.46	.06	.29	.01	-0.12	-.01
Family income <\$15k	-4.18	-.17*	-3.92	-.17*	-6.67	-.20*	-3.75	-.13*	-3.09	-.18*
Home alone w/o adults 3+hrs	-2.83	-.10*	-2.81	-.10*	-2.82	-.10*	-2.97	-.10*	-2.00	-.09*
Parent education < high sch.	-3.81	-.12*	-3.70	-.13*	-4.19	-.07*	-4.97	-.13*	-1.45	-.07*
Sibling(s) dropped out	-2.46	-.09*	-2.39	-.09*	-1.98	-.06*	-2.81	-.10*	-1.18	-.06*
Limited English proficiency	-5.04	-.07*	-4.92	-.08*	-7.54	-.07*	-5.19	-.06*	-4.27	-.12*
Parent unemployed	-.64	-.01	-0.52	-.01	-1.83	-.03	-1.07	-.02	.31	.01
Free or reduced-price lunch	-3.96	-.14*	-3.84	-.14*	-2.18	-.04	-3.39	-.09*	-1.99	-.11*
R^2		.15*		.15*		.07*		.10*		.11*

Notes: 1. (1) non-standardized regression coefficients; (2) standardized coefficients.

2. * $p < .01$.

Table 5. Multiple regression analysis on dropout status

Risk factor	All students		Public schools		Private schools		White +Asian		Minority	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Intercept	1.01	--	1.01	--	1.00	--	1.01	--	.99	--
Single parent	.01	.02	.01	.02	-.00	-.02	.01	.01	.02	.05
Family income <\$15k	.03	.05*	.03	.05*	-.01	-.04*	.05	.08*	.00	.01
Home alone w/o adults 3+hrs	.01	.01	.01	.01	.00	.01*	.00	.01*	.01	.02
Parent education < high sch.	.09	-.13*	.09	.13*	.04	.12*	.12	.15*	.06	.10*
Sibling(s) dropped out	.05	-.09*	.05	.09*	.03	.13*	.05	.09*	.04	.07*
Limited English proficiency	-.01	-.00	-.01	-.01	-.00	-.00	.02	.01*	-.01	-.01
Parent unemployed	.05	.05*	.05	.05*	-.00	-.00	.02	.02	.10	.12*
Free or reduced-price lunch	-.00	-.01	-.01	-.01	-.01	-.03	-.01	-.02	.03	.07*
Lowest quartile in achieve.	.06	.12*	.06	.12*	.01	.07	.08	.14*	.04	.08*
R^2		.07*		.07*		.04*		.09*		.06*

Notes: 1. (1) non-standardized regression coefficients; (2) standardized coefficients.

2. * $p < .01$.

Table 6. Percentage of students by the number of risk factor and by race-ethnicity, community type, and school control

Subgroup	Number of risk factors					
	0	1	2	3	4	5+
All students	48.1(.88)	25.7(.43)	14.1(.38)	7.6(.32)	3.2(.20)	1.2(.12)
<u>Race-ethnicity</u>						
African American	20.4(1.48)	24.1(.87)	24.2(.92)	18.4(.98)	9.3(.78)	3.6(.46)
Asian American	52.0(2.29)	26.9(1.46)	11.3(1.16)	5.6(.82)	3.2(.20)	1.1(.40)
Hispanic	22.0(1.85)	26.3(1.07)	24.0(1.24)	15.2(1.01)	8.4(.84)	4.2(.56)
Native American	24.9(4.55)	23.2(3.14)	23.9(2.99)	17.5(3.61)	7.8(2.72)	2.7(1.32)
White	57.1(.85)	25.9(.53)	10.8(.36)	4.5(.24)	1.4(.12)	.3(.06)
<u>Community type</u>						
Urban	38.2(1.70)	26.0(.79)	17.0(.78)	11.1(.70)	5.4(.49)	2.2(.27)
Suburban	56.0(1.13)	25.0(.58)	11.4(.51)	5.1(.42)	1.8(.24)	.6(.13)
Rural	45.0(1.69)	26.4(.88)	15.6(.69)	8.3(.59)	3.4(.33)	1.3(.26)
<u>School control</u>						
Public	45.6(.95)	26.0(.46)	15.1(.41)	8.4(.36)	3.6(.22)	1.4(.14)
Private - Rel.	66.0(1.82)	23.7(1.08)	7.5(.78)	2.2(.35)	.6(.17)	.1(.05)
Other	76.7(1.71)	19.1(1.56)	3.4(.76)	.6(.38)	.1(.07)	.1(.06)

Note: 1. figures in parentheses are standard errors

Source: National Center for Education Statistics, National Educational Longitudinal Studies of the eighth graders in 1988.

Table 7. Percentage of students in each risk factor by race-ethnicity, community type, and school control

Subgroup	Risk factor								N
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Total students	21.7	21.1	13.5	10.2	16.5	2.1	4.7	14.6	22,626
Race-ethnicity									
African American	45.8	47.0	19.3	16.3	21.7	1.5	9.5	36.2	2,726
Asian American	13.0	17.8	15.8	8.6	10.1	6.8	4.5	14.8	1,352
Hispanic	22.2	37.5	16.7	33.0	24.7	8.4	7.8	38.3	2,748
Native American	30.0	40.1	19.2	12.2	24.4	8.9	8.0	40.2	215
White	17.5	14.1	11.9	6.0	14.6	.7	3.5	7.0	15,315
Community type									
Urban	28.7	26.9	14.8	12.1	18.6	2.8	6.0	26.8	6,844
Suburban	18.8	14.5	12.6	8.1	14.5	1.7	3.8	7.1	9,363
Rural	20.2	25.8	13.7	11.7	17.7	2.1	5.0	15.3	6,419
School control									
Public	22.5	22.9	13.9	11.3	17.5	2.3	5.1	16.1	18,132
Private - Rel.	15.6	8.4	11.2	2.4	8.5	.6	2.3	3.5	3,133
Other	13.7	2.0	7.3	.2	5.9	.8	.6	1.3	1,361

- Notes: 1. (1) Single parent; (2) Family income below \$15k; (3) Home alone without adults for 3+ hours; (4) Parent education less than high school; (5) Sibling dropped out; (6) Limited English proficiency; (7) At least one parent unemployed; (8) Attended school with 50%+ in free lunch
2. figures in parentheses are standard errors
3. * indicates the difference between two groups is significant at the .01 level

Source: National Center for Education Statistics, National Educational Longitudinal Studies of the eighth graders in 1988.

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